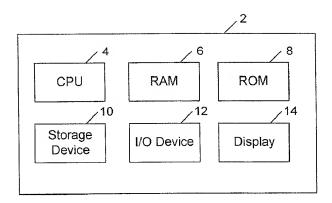
Inventor: Bradley N. Maker Title: Implicit-Explicit Switching For Finite Element Alalysis Atty. Docket No. M-9939 US Sheet 1 of 8

FIG. 1



Title: Implicit-Explicit Switching For Finite Element Alalysis Atty. Docket No. M-9939 US Sheet 2 of 8 200 **START** FIG. 2 $t = \Delta t^{implicit}$ 202 Begin Step Using Implicit Method 210 i = 1204 Advance Time: Initialize Implicit $t = t + \Delta t^{implicit}$ Method Compute Implicit $t = min \ (\ t\ , \ t^{end}\)$ Solution $\mathbf{u}'(t)$ 208 NO 214 206 Next Iteration YES Test For Test For i = i + 1End Time Convergence NO YES 212 **END** NO Test Iteration Limit, Energy YES 230 Switch To Switch To **Explicit Method** Implicit Method $t = t - \Delta t^{implicit}$ $t = t + \Delta t^{implicit}$ -218 Initialize Explicit Method $\mathbf{v} = \Delta \mathbf{u}^{\text{last}} / \Delta t^{\text{implicit}}$ a = 0.220 Set Switch Time $t^{\rm switch} = t + t^{\rm explicit_max}$ -222 Compute Explicit Solution $\mathbf{u}(t)$ 228 224 YES Test For Advance Time $t = t + \Delta t^{\text{explicit}}$ End Time NO 226 NO Test For Switch Time YES

Inventor: Bradley N. Maker

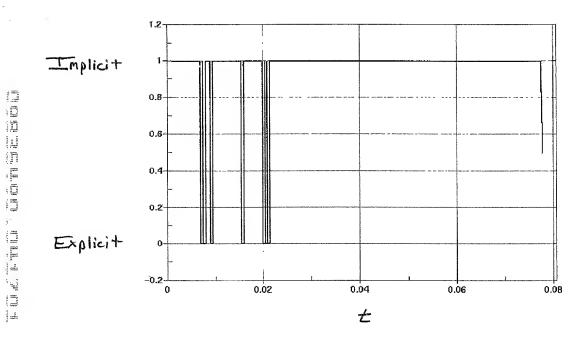
Test For Switch Time

YES

 $t = t + \Delta t^{\text{explicit}}$

NO

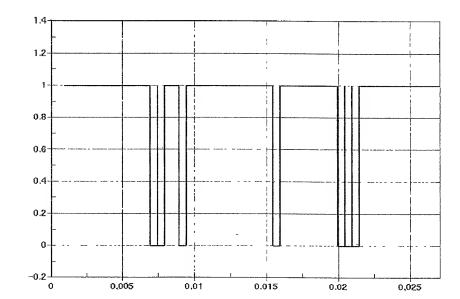
FIG. 4A



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FIG. 4B





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FIG. 4C



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FIG. 4D

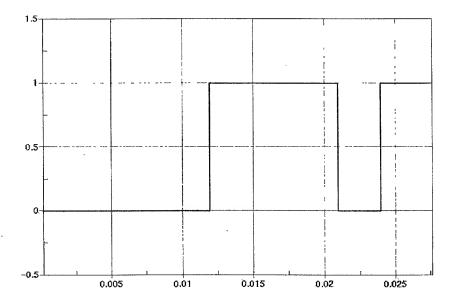


FIG. 5A

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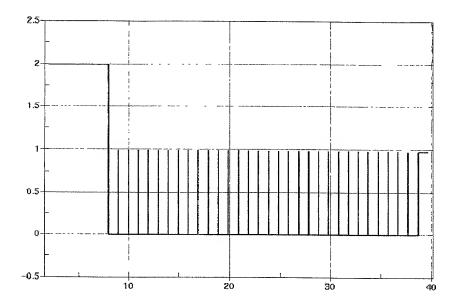


FIG. 5B

